

## CLAIMS

1. A method for detecting signal information in a wireless relaying network, said method comprising the steps of:

- 5       - storing, as a priori known signal information, signal information representative of a first set of information including at least one data unit to be transmitted in total more than one time over at least one link;
- subsequently receiving signal information representative of a second set of information, wherein a transmission of said at least one data unit interferes with the  
10 reception of said second set of information; and
- detecting at least part of said second set of information by interference cancellation based on the received signal information and at least part of said previously stored a priori known signal information.

15 2. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said interference cancellation includes at least one of explicit and implicit interference cancellation.

3. The method for detecting signal information in a wireless relaying network  
20 according to claim 1, wherein said at least one data unit is to be transmitted in total more than one time over more than one link.

4. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said wireless relaying network includes at least one of a  
25 wireless multi-hop network, a cooperative relaying network and a repeater-based network.

5. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said detecting step involves one of single-user detection  
30 and multi-user detection.

6. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said step of detecting at least part of said second set of information includes the step of processing a set  $\tilde{D}_\Sigma$  representative of previously detected data packets and the received signal information  $R_i$  according to:

$$\tilde{D} = f(R_i, \tilde{D}_\Sigma),$$

where  $f$  is a predetermined objective function and  $\tilde{D}$  is the resulting set of detected data packets.

7. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said step of detecting at least part of said second set of information comprises the steps of:

- removing a priori known signal information from the received signal information to generate a residual signal; and
- processing said residual signal to detect at least part of said second set of information.

8. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said a priori known signal information includes previously received baseband signal information, and said step of detecting at least part of said second set of information comprises the step of jointly processing said previously received baseband signal information and subsequently received baseband signal information to detect at least part of said second set of information.

9. The method for detecting signal information in a wireless relaying network according to claim 8, wherein said previously received baseband signal information relate to a number of previous communication instances and the subsequently received baseband signal information relates to the current communication instance, and said

previously received baseband signal information and said subsequently received baseband signal information are processed together with complex channel gain information to determine an estimation of at least one detected data packet.

5 10. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said a priori known signal information includes previously received and detected information.

11. The method for detecting signal information in a wireless relaying network  
10 according to claim 10, wherein said previously received and detected information includes previously overheard information.

12. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said a priori known signal information includes own  
15 transmitted information.

13. The method for detecting signal information in a wireless relaying network according to claim 1, wherein said step of detecting at least part of said second set of information is based on transmission schedule information.

20 14. The method for detecting signal information in a wireless relaying network according to claim 13, wherein said first set of information includes a number of data packets, and said transmission schedule information includes information on which of the data packets that are to be transmitted when the signal information representative  
25 of said second set of information is received such that an appropriate part of said previously stored a priori known signal information is exploited in said detecting step.

15. The method for detecting signal information in a wireless relaying network according to claim 1, further comprising the step of continuously updating said a priori  
30 known signal information.

16. The method for detecting signal information in a wireless relaying network according to claim 1, wherein at least two nodes communicate bi-directionally via at least one intermediate relay node, said intermediate relay node concurrently forwarding signal information received from said at least two communicating nodes, each of which detects signal information from the other communicating node by interference cancellation based on the concurrently forwarded signal information from the intermediate relay node and its own transmitted signal information.

17. An arrangement for detecting signal information in a wireless relaying network, said arrangement comprising:

- means for storing, as a priori known signal information, signal information representative of a first set of information, including at least one data unit to be transmitted more than one time over at least one link;

- means for receiving signal information representative of a second set of information, wherein a transmission of said at least one data unit interferes with the reception of said second set of information; and

- means for detecting at least part of said second set of information by interference cancellation based on the received signal information and at least part of said previously stored a priori known signal information.

18. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said interference cancellation includes at least one of explicit and implicit interference cancellation.

19. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said at least one data unit is to be transmitted in total more than one time over more than one link.

20. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said wireless relaying network includes at least one of

a wireless multi-hop network, a cooperative relaying network and a repeater-based network.

21. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said means for detecting is operable for performing at least one of single-user detection and multi-user detection.

22. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said means for detecting at least part of said second set of information includes means for processing a set  $\tilde{D}_\Sigma$  representative of previously detected data packets and the received signal information  $R_i$  according to:

$$\tilde{D} = f(R_i, \tilde{D}_\Sigma),$$

where  $f$  is a predetermined objective function and  $\tilde{D}$  is the resulting set of detected data packets.

23. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said means for detecting at least part of said second set of information comprises:

- means for removing a priori known signal information from the received signal information to generate a residual signal; and
- means for processing said residual signal to detect at least part of said second set of information.

24. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said a priori known signal information includes previously received baseband signal information, and said means for detecting at least part of said second set of information comprises means for jointly processing said

previously received baseband signal information and the subsequently received baseband signal information to detect at least part of said second set of information.

25. The arrangement for detecting signal information in a wireless relaying network according to claim 24, wherein said previously received baseband signal information relate to a number of previous communication instances and the subsequently received baseband signal information relates to the current communication instance, and said means for jointly processing is operable for processing said previously received baseband signal information and said subsequently received baseband signal information together with complex channel gain information to determine an estimation of at least one detected data packet.

26. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said a priori known signal information includes previously received and detected information.

27. The arrangement for detecting signal information in a wireless relaying network according to claim 26, wherein said previously received and detected information includes previously overheard information.

28. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said a priori known signal information includes own transmitted information.

29. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said means for detecting at least part of said second set of information operates based on transmission schedule information.

30. The arrangement for detecting signal information in a wireless relaying network according to claim 29, wherein said first set of information includes a number of data

packets, and said transmission schedule information includes information on which of the data packets that are to be transmitted when the signal information representative of said second set of information is received, and said means for detecting comprises means for selecting, based on said transmission schedule information, an appropriate  
5 part of said previously stored a priori known signal information for use in detecting at least part of said second set of information.

31. The arrangement for detecting signal information in a wireless relaying network according to claim 17, further comprising means for continuously updating said a  
10 priori known signal information by incorporating newly detected information and removing outdated signal information.

32. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein at least two nodes communicate bi-directionally via at  
15 least one intermediate relay node, said intermediate relay node being configured for concurrently forwarding signal information received from said at least two communicating nodes, each of which is configured for detecting signal information from the other communicating node by interference cancellation based on the concurrently forwarded signal information from the intermediate relay node and its  
20 own transmitted signal information.

33. The arrangement for detecting signal information in a wireless relaying network according to claim 17, wherein said arrangement is implemented in a network node of  
said wireless relaying network.

25 34. A communication system for wireless relaying, said communication system comprising at least two bi-directionally communicating nodes and at least one intermediate relaying node, wherein:

each of said at least two bi-directionally communicating nodes is configured for transmitting signal information to said at least one relaying node and storing its own transmitted signal information as a priori known signal information,

5 said at least one relaying node is configured for concurrently transmitting the received signal information to said at least two bi-directionally communicating nodes,

each of said at least two bi-directionally communicating nodes is configured for detecting signal information from the other communicating node by interference cancellation based on the concurrently transmitted signal information from the relaying node and its own stored a priori known signal information.